Interim Biomedical Waste Management Guidelines

Draft

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Introduction

The guidelines which follow are intended to provide an approach to the management of biomedical waste that is: firstly, safe for both waste handlers and the environment; and secondly, cost-effective and practical.

The draft guidelines were developed under the direction of the Saskatchewan Biomedical Waste Working Committee. The guidelines are based on the Guidelines for the Management of Biomedical Waste in Canada (Canadian Council of Ministers of the Environment (CCME), June 1991). They are also intended to be as consistent as possible with existing provisions in, as well as anticipated changes to, the Transportation of Dangerous Goods Regulations.

These guidelines will also serve as the first step in the development of a long term strategy for the mangement of biomedical waste in Saskatchewan.

The guidelines apply to, but are not limited to, the following facilities:

- Hospitals;
- Nursing Homes and Extended Care Facilities;
- Public Health Units;
- Physicians' Offices and Clinics;
- Dentists' Offices and Clinics;
- Medical Research and Medical/Health Care Teaching Facilities;
- Veterinarians' Offices and Clinics;
- Veterinary Teaching Establishments;
- Clinical Testing or Research Laboratories;
- Facilities Involved in the Testing or Production of Vaccines;
- Nursing Offices;
- Blood Banks and Blood Collection Centres; and
- Pre-hospital Medical Care.

Waste Minimization

This is an important first step in managing wastes responsibly and in a cost-effective manner. There are many possible routes to minimizing the amount of both general waste and biomedical wastes within the health care or related facility. Some of the principles of waste minimization are listed below but will be further developed in the long term strategy.

Segregation

Source segregation of general wastes from biomedical wastes will provide great potential for minimizing costs. Analysis has revealed that a small proportion of the wastes generated at a health care or similar facility is actually biomedical waste. Generally, this segregation includes the following types of materials:

Biomedical Wastes:	Human Anatomical Waste
	Animal Anatomical Waste
	Microbiology Laboratory Waste
	Blood and Body Fluids
	Waste Sharps
	Special Precaution Wastes
General Waste:	Kitchen Wastes
	Adminstration Wastes
	Building Maintenance
	Lawn/Garden Waste
	General Ward Waste
	Animal Husbandry Waste

Considerable cost offsets can be achieved if the entire waste stream does not have to be treated as biomedical waste.

Product Substitution

- Consider and periodically re-evaluate the potential for substitution of single use/disposable medical and surgical supplies with reusable items. Factors such as patient and worker health protection considerations, cost, convenience, labour, available space and worker acceptance should be a part of the assessment;
- Consider the possibility for product substitution for those with reduced product packaging.
- Consider the use of products that contain recycled materials and initiate recycling of appropriate general wastes wherever possible.
- Employ containers composed of non-halogenated plastics where incineration of the waste is necessary.
- Health care supplies manufactured of non-halogenated plastics or recycled materials are being developed or are presently available in several instances. Facility administrators are encouraged to pursue these types of items and where not presently available, encourage suppliers and manufacturers to develop supplies to these specifications whenever possible.

Compactors

Compactors shall not be used for contaminated or decontaminated biomedical wastes since the outside container is often destroyed during processing. This applies not only within the health care facility but during the loading and transportation process. Compactors may still be used for general wastes as defined in the preceding section.

Occupational Health & Safety

Employers must ensure that workers involved with biomedical waste management (health care, janitorial, transport and final disposal workers) have: adequate information; adequate training; and adequate protective measures.

The following are specific requirements under the Occupational Health & Safety Regulations:

- Education and training shall be provided to workers collecting, packaging, transporting, and disposing of the waste.
- Workers at risk of exposure to infectious waste shall be provided with health surveillance and management services.
- Protective measures and work procedures that are compatible with infection control guidelines shall be provided to workers.
- Workers shall have the right to participate in the establishment of procedures and the development of training programs.

The following are expected to become requirements under the Occupational Health & Safety Regulations:

- Infectious waste shall be distinguishable from non-infectious waste (i.e., shall be labelled biohazardous infectious material and shall carry the WHMIS border and a reference to a MSDS) [WHMIS = Workplace Hazardous Materials Information System; MSDS = Materials Safety Data Sheet].
- When the wastes are reasonably known to contain microorganisms that would be classified into Risk Groups 3 and 4 according to the criteria contained in the Laboratory Biosafety Guidelines, they shall be labelled accordingly. E.g., HIV Infectious Waste. (Table 1 on page 19 provides a complete list of Risk Group 4 agents and viruses.)
- Suitable generic MSDS's shall be made available to workers. MSDSs shall contain information on the most likely microorganisms, handling procedures, first aid measures, and general precautions to be used when handling the waste.
- Workers handling materials before and after identification shall be provided with the same information regarding hazards.

Human Anatomical Waste

Definition:

This class consists of human tissues, organs and body parts, including those parts which have been preserved, but excludes teeth, hair and nails.

Guidelines:

Interim disposal is by incineration at crematoria or existing hospital incinerators where approved by the Department of Environment and Public Safety. Burial at a cemetery is the only other interim alternative for management of these wastes. Treatment of these wastes prior to disposal is not required.

Handling, Packaging and Transportation Details:

These wastes shall be segregated at the point of generation from other classes of biomedical and general wastes primarily for aesthetic reasons. Where transported off-site, the containers shall be single use, lined cardboard containers which incorporate recycled fibre where possible. The liners for the cardboard containers shall not consist of halogenated plastics where disposal is via an incinerator within the province. The containers must be sturdy enough to withstand transportation to the final disposal site. Containers for human anatomical waste shall be colour coded red and labelled according to WHMIS requirements since they are not decontaminated prior to disposal. No other types of wastes are to be mixed or included with human anatomical wastes. Storage of anatomical wastes shall be at 4 degrees C or lower. Small quantity generators may use a dedicated lockable domestic freezer for this purpose. These wastes must be transported apart from general wastes but may be transported along with other types of biomedical waste to the final incinerator site.

Animal Anatomical Waste

Definition:

This class consists of all animal tissues, organs, body parts, carcasses and bedding, unless certified by a trained person that the waste ***does not contain viruses and agents listed in Risk Group 4*** of the Medical Research Council of Canada/Health and Welfare Canada "Laboratory Bio-safety Guidelines", but excluding teeth hair and nails. (Table 1 on page 19 presents a complete list of Risk Group 4 agents and viruses.)

Guidelines:

Interim disposal procedures for these types of wastes, i.e.: those which contain or are suspected of containing Risk Group 4 agents shall be incineration at provincial veterinary incinerators where such facilities are specifically approved by the Department of Environment & Public Safety. If wastes of this class are managed under the Animal Disease Protection Act (Canada), the attending inspector has the authority to require disposal means other than incineration.

Where a qualified person has certified that these wastes ***do not contain*** Risk Group 4 agents, the wastes may be incinerated at the above noted facility, buried or consigned to a rendering plant where appropriate. Where animal anatomical wastes which do not contain the above noted agents are to be disposed at the landfill, the wastes shall be ***covered immediately*** within a dedicated biomedical waste area at the landfill site apart from locations used for the disposal of dead animals from other sources. Bedding wastes which do not contain the above noted agents may be disposed via the landfill or other traditional methods for animal husbandry wastes.

Handling Packaging and Transportation Details:

In instances where animal anatomical wastes are suspected or known to contain Risk Group 4 agents, the affected animal parts or carcasses shall be double bagged and where necessary, placed within outer containers for transport to the approved incinerator. Cutting of the wastes may be required. Where transported off-site, the containers shall be single use, lined cardboard containers which incorporate recycled fibre where possible. The

liners for the cardboard containers shall not consist of halogenated plastics where disposal is via an incinerator within the province. The containers must be sturdy enough to withstand transportation to the final disposal site. Containers for animal anatomical waste suspected or known to contain Risk Group 4 agents shall be colour coded orange and labelled according to WHMIS requirements since they receive no pre-transport decontamination. No other types of biomedical wastes are to be mixed or included with these other than associated disposable items which are saturated or dripping with blood. These wastes should be destroyed as soon as possible however if storage is necessary, anatomical wastes shall be kept at 4 degrees C or lower. Small quantity generators may use a dedicated lockable domestic freezer for this purpose. These wastes must be transported to the incinerator in dedicated loads only or in conjunction with solid Special Precaution Wastes because of the potential serious consequences. Decontamination of all affected areas may be necessary under the direction of a trained person. Please refer to the Special Precaution Waste section for waste management protocols for items such as microbiology laboratory waste, blood or body fluid waste or sharps which are contaminated with Risk Group 4 agents.

In instances where the wastes are certified as ***not containing Risk Group 4 agents,*** the following handling, packaging and transportation details shall apply. The wastes shall be segregated at the point of generation from other classes of biomedical and general wastes. Where off-site disposal by incineration at one of the approved facilities is selected, the containers shall be single use, lined cardboard containers which incorporate recycled fibre where possible. The liners for the cardboard containers shall not consist of halogenated plastics where disposal is via an incinerator within the province. The containers must be sturdy enough to withstand transportation to the final disposal site. Non-halogenated plastic bags alone may be considered in conjunction with a reusable transport container, if the waste is to be destroyed at an on-site incinerator.

Where disposal by burial is selected, the containers for the animal anatomical waste shall be within containers able to withstand transport to the site intact. The containers may include plastic bags or plastic bags within cardboard containers, if the integrity of the bags during the transportation process is at all suspect. Where possible cardboard

containers should incorporate recycled fibre. All containers of solid laboratory waste must bear a "NON-HAZARDOUS" label and a generator code. These wastes must be transported apart from general wastes but may be transported along with other types of biomedical waste.

Containers for animal anatomical waste not containing Risk Group 4 agents may be blue or green. No other types of wastes are to be mixed or included with animal anatomical wastes other than associated disposable items saturated or dripping with blood. Where necessary, storage of anatomical wastes shall be at temperatures of 4 degrees C or lower. Small quantity generators may use a dedicated lockable domestic freezer for this purpose.

Microbiology Laboratory Waste

Definition:

This class of waste includes laboratory cultures, stocks or specimens of microorganisms, live or attenuated vaccines, human or animal cell cultures used in research and laboratory material that has come into contact with the above.

Guidelines:

Interim treatment and disposal procedures will include autoclaving followed by disposal to sanitary sewer for liquids and disposal at a sanitary landfill for solids. ***Immediate covering*** of solid laboratory wastes within a dedicated biomedical waste area at the landfill site will be mandatory in all instances. In some instances such as spills, chemical decontamination may be acceptable as a treatment protocol.

Handling, Packaging and Transportation Details:

These wastes shall be segregated at the point of generation from other classes of biomedical and general wastes. Evidence proves that once these materials have been properly decontaminated they pose less of a hazard than household refuse. However, careful attention must be paid to the treatment methods to ensure that the wastes are in fact "decontaminated" by the autoclave process.

Autoclaving of laboratory wastes must be performed by trained personnel using safe and effective techniques. Hospital infection control staff are generally able to provide sound advice on worker safety concerns while ensuring that adequate decontamination methodologies. Records of time temperature and pressure to which each load has been exposed shall be recorded and retained so that evidence can be provided to landfill operators should questions arise. If chemical disinfection is to be employed for spill clean-up, a 5,000 ppm solution of sodium hypochlorite (1:10 dilution of household bleach (5.25%)) is recommended for an interval sufficient to destroy the agent of concern.

Decontaminated solid laboratory wastes destined for the landfill must be packaged within yellow coded containers able to withstand transport to the site intact. The containers may include plastic bags or plastic bags within cardboard containers, if the integrity of the bags during the transportation process is at all suspect. Where possible cardboard containers should incorporate recycled fibre. All containers of solid laboratory waste must bear a "DECONTAMINATED" label and a generator code. These wastes must be transported apart from general wastes but may be transported along with other types of biomedical waste.

Blood & Body Fluids

Definition:

This group of wastes includes fluid blood, blood products, body fluids contaminated with blood and body fluids removed for diagnosis or removed during surgery, treatment or autopsy. Please refer to the "Special Precautions Waste" section if blood, body fluids or items saturated or dripping with blood are associated with Risk Group 4 agents. (Table 1 on page 19 presents a complete list of Risk Group 4 agents and viruses.)

Guidelines:

Interim waste management protocols for these wastes includes carefully pouring the wastes down the sanitary sewer while being cautious to prevent the formation of aerosols or spills. Only sanitary sewer systems which have at least secondary treatment shall be employed for the disposal of blood and body fluids by this method.

Items saturated or dripping with blood or body fluids including disposable surgical drapes, surgical gowns, sponges and wet dressings, etc are to be autoclaved, labelled as decontaminated and transported to the landfill. ***Immediate covering*** of decontaminated items which were saturated or dripping with blood within a dedicated biomedical waste area at the landfill site will be mandatory in all instances. Alternatively, in instances where "Clean side - Dirty side" limitations for autoclaving of disposable items saturated or dripping with blood are encountered, disposal of these items by means of an incinerator approved for such purposes by Saskatchewan Environment and Public Safety is acceptable.

Handling, Packaging and Transportation Details:

Universal Precautions shall apply to the handling of blood and body fluids for all patients.

When necessary, on-site and off-site transportation of blood and body fluid wastes must be performed within containers that are able to withstand the abuse that may be received during the processes. There are presently no "Approved" containers, therefore those which have been proven effective at the facility may continue to be used. All containers for the transportation of blood and body fluid wastes shall be colour coded yellow and labelled in accordance with WHMIS requirements.

Disposable items which are saturated or dripping with blood, such as surgical drapes, surgical gowns, sponges, closed drainage tubes and dressings, etc shall be autoclaved and then sent to the dedicated biomedical waste area of the landfill. These items shall be packaged within yellow containers or plastic bags which are sturdy enough to withstand the decontamination and transportation processes. All containers of these waste items must bear a "DECONTAMINATED" label a generator code. These wastes must be transported apart from general wastes but may be transported along with other types of biomedical waste.

Alternatively, in instances where "Clean side - Dirty side" limitations for autoclaving of disposable items saturated or dripping with blood are encountered, disposal of these items by means of an approved incinerator is acceptable. The disposable items saturated or dripping with blood must be packaged within containers which are yellow in colour or marked with a yellow 50 mm band. These items shall bear a "CONTAMINATED" label in accordance with WHMIS requirements and a generator code. Where transported off-site, the containers shall be single use, lined cardboard containers which incorporate recycled fibre where possible. The liners for the cardboard containers shall not consist of halogenated plastics where disposal is via an incinerator within the province. These wastes must be transported apart from general wastes but may be transported along with other types of biomedical waste.

Waste Sharps

Definition:

This group of wastes includes clinical and laboratory materials consisting of needles, syringes, blades or laboratory glass capable of causing cuts or punctures.

Guidelines:

Interim provisions for dealing with these wastes include handling within puncture-proof containers followed by autoclaving, certification as decontaminated and transport to a landfill. ***Immediate covering*** of these wastes within a dedicated biomedical waste area at the landfill site will be mandatory in all instances. Disposal by means of incinerator approved by the Department is also acceptable.

Handling, Packaging and Transportation Details:

These wastes shall be segregated at the point of generation from other classes of biomedical and general wastes. The handling, transport and disposal of waste sharps is of concern since unless these wastes are handled properly they pose a significant hazard. Functionally, these concerns are based in the principles of disease transmission. The waste sharps can carry a viable infectious agent as well as create a portal of entry by causing wounds if not safely packaged and handled. Therefore if the infectious agents can be destroyed through the decontamination method the waste sharps pose much less of a hazard than before treatment. Careful attention must be paid to the treatment methods to ensure that the wastes are in fact "decontaminated" by the autoclave process.

Autoclaving of waste sharps must be performed by trained personnel using safe and effective techniques. Hospital infection control staff are generally able to provide sound advice on worker safety concerns while ensuring adequate decontamination methodologies. Records of time temperature and pressure to which each load has been exposed shall be recorded and retained so that evidence can be provided to landfill operators should questions arise.

Decontaminated waste sharps destined for the landfill must be packaged within yellow coded containers able to withstand transport to the site intact. Several commercial types of containers are acceptable but must be able to withstand autoclaving without melting and transportation without becoming punctured. The containers shall meet the requirements for construction and use described in Section 4.4.7 of the CCME Guidelines for the Management of Biomedical Wastes in Canada. The containers must be yellow in colour or marked with a yellow 50 mm band. All containers of waste sharps must bear a "DECONTAMINATED" label a generator code. These wastes must be transported apart from general wastes but may be transported along with other types of biomedical waste.

Where disposal of waste sharps at an incinerator approved by the Department is selected the sharps must be packaged within yellow coded containers able to withstand transport to the incinerator site intact. Several commercial types of containers are acceptable but must not be constructed from halogenated material where they are to be incinerated by means of an incinerator within the province. The containers must be yellow in colour or marked with a yellow 50 mm band. These items shall bear a "CONTAMINATED" label in accordance with WHMIS requirements and a generator code.

Special Precaution Waste

Definition:

This class of wastes includes body wastes, microbiology laboratory wastes, blood and body fluids, dressings, sharps and virtually all other waste types associated with patients with Risk Group 4 agents including Lassa fever, Marburg virus disease, Ebole virus disease, Junin haemorrhagic fever, Machupo haemorrhagic fever Congo-Crimean fever and others. (Table 1on page 19 presents a complete list of Risk Group 4 agents and viruses.)

Guidelines:

These wastes are to be treated in accordance with Laboratory Centre for Disease Control, Health and Welfare Canada Laboratory Bio-safety Guidelines at all times. The very low incidence of these types of diseases within the province reduces the requirement for extensive preparations for dealing these wastes.

Handling, Packaging and Transportation Details:

These wastes shall be segregated at the point of generation from other classes of biomedical and general wastes. The handling, transport and disposal of special precaution wastes is of concern because the pathogens produce very serious human or animal disease, which is often un-treatable and which can be passed by direct, indirect or casual means.

"Although extremely rare and unlikely to appear in Canada, the following procedures must be followed when disposing of wastes contaminated with these agents":

- All liquid wastes, including bed bath wastes, must be treated by dilution with a 5.25% commercial sodium hypochlorite solution to a 1:5 solution. Let stand 24 hours and pour into wide mouth polypropylene containers. These should then be autoclaved and carefully poured into the sanitary sewer system; and
- Needles, syringes and solid laboratory wastes shall be placed in punc-

ture resistant containers, double bagged in autoclave bags, autoclaved and then incinerated. Bagged wastes where necessary, shall be placed within outer containers for transport to the approved incinerator. Generally, the containers shall be single use, lined cardboard containers which incorporate recycled fibre where possible. The liners for the cardboard containers shall not consist of halogenated plastics where disposal is via an incinerator within the province. The containers must be sturdy enough to withstand transportation to the final disposal site. Containers for these wastes shall be colour coded orange and labelled in accordance with WHMIS requirements. These wastes should be destroyed as soon as possible however if storage is necessary, anatomical wastes shall be kept at 4 degrees C or lower. Small quantity generators may use a dedicated lockable domestic freezer for this purpose. These wastes must be transported to the incinerator in dedicated loads only or in conjunction with Animal Anatomical Wastes contaminated with Risk Group 4 Agents because of the potential serious consequences. Decontamination of all affected areas may be necessary under the direction of a trained person.

Cytotoxic Chemical Waste

Definition:

Included in this class of waste materials are drugs, remnants of treatments, sharps, gloves, masks and other materials associated with the preparation and administration of antineoplastic (anti-cancer) drugs.

Guidelines:

Interim strategies for the management of these wastes include off-site high temperature incineration, chemical degradation or return to supplier. These wastes must be transported within puncture-proof containers subject to the requirements of the Transportation of Dangerous Goods Regulations.

Handling, Packaging and Transportation Details:

These wastes shall be segregated at the point of generation from other classes of biomedical and general wastes. The handling, transport and disposal of these wastes is of concern because of their potential mutagenic, carcinogenic or teratogenic effects. The drugs and associated wastes shall be handled in accordance with Saskatchewan Human Resources, Labour and Employment - Occupational Health and Safety published guidelines.

The primary method for disposal of Cytotoxic Chemical Wastes is transport to a high temperature incinerator. Unfortunately, no such facilities exist within the province, therefore necessitating interim storage of these wastes awaiting ultimate trans-boundary shipment. These wastes shall be stored within sealed rigid plastic over-pack containers made of materials acceptable for incineration. The containers shall be colour coded yellow and bear a cytotoxic symbol which meets WHMIS requirements. A dedicated storage area is required for these wastes.

Chemical degradation is recommended for disposal of small quantities of cytotoxic materials or as a protocol for dealing with spills. Where chemical degradation is selected as the disposal pathway, techniques provided by the following publications are recommended:

Armour, M.A., et al. Potentially Carcinogenic Chemicals Information and Disposal Guide. 1986. University of Alberta, Edmonton, Alberta.

Table 1
Risk Group 4 Agents*

Bacteria None
Fungi None
Viruses Arenaviridae Lassa, Junin, Machupo viruses Bunyaviridae Genus Nairovirus Crimean-Congo hemorrhagic fever Filoviridae Marburg virus Ebola virus Flaviviridae Tick-borne encephalitis complex, including - Russian Spring-Summer Encephalitis Kyasanur forest virus Omsk hemorrhagic fever virus Herpesviridae Alphaherpesvirinae Genus Simplexvirus: Herpes B virus (Monkey B virus) Poxviridae Genus Orthopoxvirinae Variola Monkeypox
Parasites None

* **Risk Group 4 (high individual risk, high community risk)**
A pathogen that usually produces very serious human or animal disease, often untreatable, and may be readily transmitted from one individual to another, or from animal to human or vice-versa directly or indirectly, or by casual contact.

Taken from:
Laboratory Biosafety Guidelines. Medical Research Council of Canada (MRC)/Health and Welfare Canada, 1990.